

"Such a muddle as that respecting the boundary of Alaska, and futile suggestions like those which were made for the boundaries of British Guiana, before the final settlement, could never have been made if the statesmen who were responsible had consulted geographers, and had acted on their advice."

Related to this is the subject of topographical surveys. It ought to be a political axiom that a Government should know its country; but we are all aware how frequently this duty is neglected, and the war in South Africa has brought the deficiency into unpleasant prominence. Even the "man in the street" is now in a state of mind to agree that

"If the survey of British South Africa had been begun years ago, or even as late as 1880, and pushed forward with an ample supply of trained surveyors, the war of 1899-1900 within its borders would have been simpler, safer and immensely cheaper."

In addition to topographical surveys, there should be geological surveys, hydrographic surveys, climatological surveys, biological surveys, and other official determinations of the features, fauna and flora of the country, with a view to possessing trustworthy information for future as well as present service. The fundamental value of a knowledge of rainfall in determining the value of colonisable countries is not often recognised, though so much depends upon it. How important an extensive system of rain measurement is in some new countries is shown by the fact that Australians in their calculations often convert inches of rain into numbers of sheep or even pounds of wool per acre. This and other similar cases justify Dr. Mill's remark that

"in almost every case it will be found that the crux of a new land is the water supply. Water, as rain or rivers, is indeed the very life-blood of the habitable world, and the phenomena of its circulation are often complicated, and require much study to elucidate."

It is unnecessary in these columns to give further instances of the dependence of the success of the colonist upon the scientific information available concerning his adopted country. The difficulty is to relieve practical politicians of the thought that knowledge for which there is no immediate use is useless; they have no sympathy with purely scientific work, therefore they are unwilling to encourage it. Let us hope that in the course of time our statesmen will receive an early training in scientific method and foresight, sufficient to enable them to consider colonisation as a study in anthropogeography instead of a haphazard system of settlement.

OUR BOOK SHELF.

The Child: a Study in the Evolution of Man. By A. F. Chamberlain, M.A., Ph.D. Pp. i-xii + 495. With Illustrations. The Contemporary Science Series. (London: Walter Scott, Ltd, 1900.)

THIS book is intended as a study of the child in the light of the literature of evolution; an attempt to record and, if possible, interpret some of the most interesting and important phenomena of human beginnings in the individual and in the race. Anthropology, as a science embracing many aspects of the human race, is concerned with inquiry as to the evolution of man, and applies fresh knowledge, gained by scientific methods, to the correlation of ascertained facts. The book refers more to the psychological aspect of human development than to the physiological causes of evolution; dealing in a philosophical

spirit—not always by strictly scientific processes—with the several subjects dealt with, evidence is afforded by the collection of data and the opinions expressed by many writers rather than based upon the author's own observations and arguments.

In the opening chapter on "the helplessness of infancy" the results that follow from early weakness and the prolonged period of dependency are shown by numerous quotations, while explanation is afforded by reference to Mr. Fiske's view that this has led to the lengthened association of children with their parents and thus developed social habits. The comparative adolescence and longevity of man and animals is shown, and the dictum of Schleiermacher, "Being a child must not hinder becoming a man; becoming a man must not hinder being a child," suggests application to education.

The periods of childhood suggested as distinctive of stages in development are numerous, and definitions from Pythagoras downwards are given. Dr. Chamberlain says, "not only does the child seem to recapitulate physically and mentally the chief points of the race's history, but his own development is fairly teeming with epochs and periods, isolated spots sometimes, the interpretation of which is not yet at hand." The examples given are very interesting, but do not convince us that there is sufficient evidence of any standard by which normal psychological development can be judged. The successive manifestations of mental growth in children form a promising field in child-study; the account given of the linguistic periods in the advance towards speech forms one of the most interesting chapters in this book. Other chapters are explanatory of the relations of the child with the savage and criminal showing certain analogies, but do not afford much guidance in studying child-evolution or explain why the children are such as we find them to be.

The desire to explain the evolution of infancy has sometimes led the author wide of the teaching of scientific views, as when he says, p. 442, "The moment Nature decided that, with man, the struggle for existence was ultimately to be altruistic, rather than selfish, she was forced to make man weak in order to ensure his later strength in the right direction." Such teaching leads the student to neglect the facts of physiology and the effects of physical environment.

The book presents much of interest to the philosophical reader, and maintains the contention that the teaching of evolution and child-study should go hand in hand as mutually instructive.

The value of this volume would be increased by a table of contents; this want is accentuated by the brevity of the index. Eighteen illustrations afford useful explanations of types of manhood and the artistic productions of children.

Sieroterapia e Vaccinazioni preventive contro La Peste Bubonica. Dott. Alessandro Lustig. Pp. vi + 150. (Torino: Rosenberg and Sellier, 1899.)

THIS book gives an account of the preparation of anti-plague serum by the author's method.

According to Prof. Lustig, a considerable degree of immunity against plague is obtained by inoculating animals with a nucleo-proteid contained in the bodies of the bacilli. A culture of plague bacilli grown on solid media is scraped off and dissolved in a 1 per cent. solution of caustic potash. After washing and passing through a Chamberland filter, the substance is used for inoculating horses.

After repeated inoculations the horses are bled, and the serum is used for treatment of plague patients.

Or a solution of the nucleo-proteid may be used as a prophylactic, as advocated by Prof. Lustig and Galeotti (*British Medical Journal*, February 10, 1900). The curative treatment was tried for a period at the Arthur Road Hospital, Bombay, but the results were not very

satisfactory. We have now however a paper before us, by Dr. A. Mayr, read at the Bombay Medical Union, April 21, 1900, dealing with more recent trials, in which there were 38·2 per cent. of recoveries in 403 patients treated, the recoveries of patients under ordinary treatment being 19·5 per cent.

Whether the nucleo-proteid be used as a prophylactic to inoculate persons or to immunise horses to prepare a curative serum, it is evident that the antitoxin given rise to in the person or the horse is an antitoxin against the poisonous nucleo-proteid; the stakes in the race for recovery are all placed on the nucleo-proteid.

But it is not improbable that the metabolic products formed by the plague microbe in the medium it grows on—be it the body or an artificial medium—require to be immunised against, and herein lies the distinction between Haffkine's prophylactic and Lustig's nucleo-proteid used as a prophylactic. Haffkine uses the bodies of the bacilli together with the broth they have grown in, for he considers the broth acted upon by their growth to be useful if not essential. This has been shown to be the case in experiments on animals by Dr. Balfour Stewart (*British Medical Journal*, March 3, 1900).

Lustig's nucleo-proteid prophylactic has some technical advantages in its preparation over Haffkine's, but for the reasons pointed out above it is not likely to be as efficacious. C. B. S.

A Monograph of the Erysiphaceae. By Ernest S. Salmon, F.L.S. "Memoirs" of the Torrey Botanical Club. Vol ix., Pp. 292. (New York: 1900).

THE Torrey Botanical Club has performed a valuable service to mycologists in the publication of this excellent monograph of the Erysiphaceæ, a group of parasitic fungi causing the diseases known as white mildew, powdery mildew, blight, *Mehlthau*, *blanc*, &c. In their conidial or "oidium" stage they are common throughout the summer on various host-plants, such as roses, hops, vines, peas, maples, and many wild plants, giving a mealy appearance to the part infected; while in the later summer or autumn the perfect ascleigerous form is produced in the form of dark brown or black spots, consisting of peritheces containing ascospores, and usually provided with characteristic appendages.

The number of known species of this well differentiated group of fungi is not large; the author describes forty-nine, including a very few new ones, in addition to a number of well-marked varieties. These are arranged in six genera, *Podosphæra*, *Sphærotheca*, *Uncinula*, *Microsphæra*, *Erysiphe*, and *Phyllactinia*. Great confusion exists in the nomenclature of the European species, and the author corrects several prevalent errors. He regards the ascus as the result of a true sexual process, and does not support Dangeard's view that the fusion of the nuclei in the young ascus is of sexual signification.

The monograph is illustrated by nine plates, and is supplemented by a very copious bibliography, in which no less than 400 distinct works or papers are referred to, and a host-index of the plants attacked by these fungi.

A. W. B.

An Old Man's Holidays. By The Amateur Angler. Pp. xii + 140. (London: Sampson Low, Marston and Co., 1900.)

"AN AMATEUR ANGLER" is an observer of nature as well as an enthusiastic Waltonian, the result being that these holiday sketches contain here and there an observation of interest to naturalists. Referring to the growing scarcity of kingfishers he says, "This is partly owing to the fact that they have the credit of being destructive enemies of young trout; the fact is, they do feed on little fishes, but not so much on trout as on minnows, dace, sticklebacks, miller's thumbs, and even leeches." The book contains several illustrations of rural scenes.

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LETTERS TO THE EDITOR.

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Buchner's Zymase.

THE most recently issued number of the *Proceedings of the Royal Society* (No. 438) contains a paper by Dr. McFadyen, Dr. Morris and Mr. Rowland on the subject of Buchner's zymase, which is held by many observers to be the alcohol-producing enzyme of yeast.

The authors describe a long series of experiments which they have carried out, partly on Buchner's lines, and partly by new methods of their own. They find, as Buchner and other investigators have done, that yeast will, under proper conditions, yield up an extract which can set up alcoholic fermentation in a solution of cane sugar. Many very interesting points have come out during the progress of their work, the explanation of which is not at present very obvious; their conclusion, however, seems to call for a very careful scrutiny of the operations, especially as it has been advanced by other writers also. They state at the end of their paper that their experiments cause them to doubt the existence of an enzyme, and lead them rather "in the direction of a theory which refers the phenomenon to the vital activity of the yeast-cell protoplasm" (p. 265).

In reviewing their experiments it is noticeable that, in their preparation, the yeast was mixed with a certain proportion of kieselguhr, and subjected in this condition to the enormous pressure of 200-300 atmospheres (p. 252). The liquid thus expressed was capable of filtration under pressure through a Chamberland or Berkefeld filter (p. 259) without losing its properties, though the process decreased its power. It was miscible with, or soluble in, a small quantity of water or solution of cane-sugar without being altogether destroyed, though too much of the solvent inhibited its action (p. 262). The experiments were conducted throughout in the presence of antiseptics, such as 1 per cent. of sodium arsenite, thymol, or toluol (p. 254).

It will be difficult for physiologists to accept a conception of a protoplasm which is not destroyed by such a pressure as was used, and which afterwards becomes to some extent soluble in water, or, at any rate, miscible with it, which can be filtered through a porcelain filter without destruction, and which can carry on an anabolic and subsequently a katabolic process (p. 265) in the presence of such antiseptics as were used.

The authors say in an earlier part of the paper (p. 253) that such a kieselguhr "sponge" as they obtained during the extraction of the yeast was capable of retaining almost entirely the globulins of eggs, and, to a large extent, albumin and serum proteids. It seems strange after this to find them holding the view that protoplasm itself was not retained by such a "sponge."

It is a little difficult to reconcile their concluding theory of a fluid protoplasm with their statement (p. 253) that the juice they obtained and used was in every case far removed in nature from the condition in which it existed when alive in the yeast cell, even if one were to admit that the *juice* was ever living at all. Is it possible, in their opinion, for the anabolic and katabolic activities of protoplasm to be manifested in such a juice as they describe in those words? Yet their final hypothesis is that the yeast juice exhibits the "vital activity of the yeast-cell protoplasm."

I venture to disagree with their conclusion. In my own experiments, which were published in the *Annals of Botany*, vol. xii (1898), p. 491, I found that an active preparation could be obtained by grinding the yeast with kieselguhr in such proportion that a perfectly dry impalpable powder resulted, and then extracting the latter with a solution of cane-sugar. It is hardly credible that protoplasm without the protection of cell-walls, can resist desiccation. The action of the extract in my experiments, as in theirs, was considerable in the presence of antiseptics which, in the proportions used, were inevitably and rapidly fatal to the life of protoplasm.

Cambridge, November 19. J. REYNOLDS GREEN.

Euclid i. 32 Corr.

MR. TUCKER is right (p. 58) in his conjecture that Clavius was not the first to publish these corollaries.

References:—P. Ramus (ob. 1572), "*Scholarum Mathematicorum Libris unus et triginta. A Lazaro Schonero recogniti et emendati*,"